Functionalization of DNA by electrostatic bonding

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Propositions
Belonging to the dissertation

Functionalization of DNA by Electrostatic Bonding

1. DNA-lipid exchange with amine derived molecules can be achieved stoichiometrically in the organic phase. (Chapter 2)

2. DNA can act as a scaffold for the self-assembly of bound lipids to realize new functions, like a multi-chromophoric light harvesting system. (Chapter 2)

3. Cyclodextrin can be transformed into an ionic liquid with moderate fluidic property at room temperature through a lipid exchange process. (Chapter 3)

4. The approach of DNA-lipid exchange is also applicable to macromolecules like polyethylene glycol (PEG). The degree of exchange is decreasing with the increase of PEG molecular weight. (Chapter 4)

5. Quaternary ammonium-lipids can be exchanged onto DNA by introducing the counterion, acetylacetate, onto these lipids. The acetylacetate can abstract a proton from DNA-ANI complex to facilitate the binding between negatively charged DNA and positively charged quaternary ammonium-lipids. (Chapter 5)

6. DNA bonded with the quaternary ammonium-PEG is more vulnerable to ion displacement than that of primary amine-PEG. (Chapter 5)

7. The development of proper characterization methods to fully understand the conformation of DNA-lipids is challenging.

8. Brave is more crucial than clever in scientific research.